

### REMARKS

Claims 1-9 and 16-18 are pending. The Examiner's reconsideration of the objections and rejections is respectfully requested in view of the remarks.

Claims 16-18 have been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The Examiner stated essentially that support is lacking for the densification or non-densification of a second layer.

Claim 16 claims, *inter alia*, "depositing a second thermal spray coating on the composite material, wherein the second thermal spray coating is not densified."

Applicant's respectfully point to Figure 2; it can be clearly seen that steps 201, 211, 202 and 210 support the deposition of additional layers, and optionally the densification of those layers. Referring particularly to Claim 16, step 201 is performed for depositing a second layer and an end is determined at step 211 such that no densification of the second layer is performed. For at least the foregoing reasons, Claim 16 is believed to satisfy the requirements of 35 U.S.C. 112, first paragraph.

Claims 17 and 18 depend from Claim 16 and are believed to be allowable for at least the reasons given for Claim 16. The Examiner's reconsideration of the rejection is respectfully requested.

Claims 1-3 and 6-8 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Mahoney (US 2003/0042291) in view of Yen et al. (USPN 4,157,923). The Examiner stated essentially that the combined teachings of Mahoney and Yen teach or suggest all the limitations of claims 1-3 and 6-8.

Claim 1 claims, "A method for densification of a thermal spray coating comprising: depositing a thermal spray coating on a substrate; and mixing the thermal spray coating and the substrate by friction stir welding, forming a composite material consisting of the thermal spray coating and the substrate."

Multiple cited prior art references must suggest the desirability of being combined, and the references must be viewed without the benefit of hindsight afforded by the disclosure. The Examiner has chosen a multitude of references, apparently in hindsight, to reject claim 1, however, even assuming *arguendo* that the references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. The references, Mahoney and Yen, individually or in

combination, lack such a suggestion or motivation for being combined. Mahoney teaches a method of welding two workpieces having an interface layer deposited there between (see paragraph [0033]). Mahoney does not suggest the desirability of mixing a coating and a substrate, and thus lacks the suggestion for combination with Yen, which teaches the deposition of an alloy on an article and the subsequent melting by a high energy beam (see Figures 1 and 2, and col. 5, lines 39-31 and col. 6, lines 48-49). Mahoney teaches the preparation of a weld joint; there is no suggestion of the desirability of using only one workpiece (e.g., a weld joint cannot include less than two workpieces in order to have an interface layer there-between). Thus, Mahoney lacks the suggestion for being combined with a Yen for treating a deposited layer and a subjacent portion of a base metal. Further, Yen fails to teach or suggest the desirability of a friction stir weld; Yen requires the use a laser beam or an electron beam for melts (see col. 7, lines 12-13; "This necessitates use of a laser beam or an electron beam."). Therefore, one would not be lead to use the friction stir weld of Mahoney in place of Yen's energy beam. Given the lack of a suggestion or motivation to combine the references, these references are not believed to be combinable. Therefore, reconsideration of the rejection is respectfully requested.

Claims 2, 3 and 6-8 depend from claim 1. The dependent claims are believed to be allowable for at least the reasons given for claim 1. The Examiner's reconsideration of the rejection is respectfully requested.

Claims 4 and 5 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Mahoney in view of Yen as applied to claims 1-3 and 6-8, and further in view of Lazarz et al. (USPN 6,227,435). The Examiner stated essentially that the combined teachings of Mahoney, Yen and Lazarz teach or suggest all the limitations of claims 4 and 5.

Claims 4 and 5 depend from claim 1. The dependent claims are believed to be allowable for at least the reasons given for claim 1. The Examiner's reconsideration of the rejection is respectfully requested.

Claim 9 has been rejected to under 35 U.S.C. 103(a) as being unpatentable over Mahoney in view of Yen as applied to claims 1-3 and 6-8 above, and further in view of Sherman (US 2003/0012678). The Examiner stated essentially that the combined teachings of Mahoney, Yen and Sherman teach or suggest all the limitations of claim 9.

Claim 9 depends from claim 1. The dependent claim is believed to be allowable for at least the reasons given for

claim 1. The Examiner's reconsideration of the rejection is respectfully requested.

Claims 16-18 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Mahoney in view of Yen as applied to claims 1-3 and 6-8 above, and further in view of Salito (USPN 6,113,991). The Examiner stated essentially that the combined teachings of Mahoney, Yen and Salito teach or suggest all the limitations of claim 16-18.

Claim 16 claims, "A method for densification of a thermal spray coating comprising: depositing a first thermal spray coating on a substrate; forming a composite material by mixing the thermal spray coating and a portion of the substrate by friction stir welding; and depositing a second thermal spray coating on the composite material, wherein the second thermal spray coating is not densified."

Multiple cited prior art references must suggest the desirability of being combined, and the references must be viewed without the benefit of hindsight afforded by the disclosure. The Examiner has chosen a multitude of references, apparently in hindsight, to reject claims 16-18, however, each at least Salito teaches away from the combination. For example, Salito teaches that in the preferred embodiment two layers are applied one *immediately* after the other (see col. 3, lines 3-13)

(emphasis added). Accordingly, one would not be lead to combine Salito with Mahoney and Yen because the time needed for creating the friction stir weld of Mahoney would prevent the immediate application of a second layer. Given that Salito teaches away from the proposed combination, the references lack a suggestion or motivation to be combined, these references are not believed to be combinable.

Further, the reasons given for allowance of claims 1-3 and 6-8 above are believed to apply equally to the present rejection as they relate to "forming a composite material by mixing the thermal spray coating and a portion of the substrate by friction stir welding"; Mahoney and Yen do not provide a suggestion or motivation to be combined.

Claims 17 and 18 depend from claim 16. The dependent claims are believed to be allowable for at least the reasons given for claim 16. Reconsideration of the rejection is respectfully requested.

For the forgoing reasons, the application, including claims 1-9 and 16-18, is believed to be in condition for allowance. Early and favorable reconsideration of the case is respectfully requested.

Respectfully submitted,

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